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Amendment and Response

Serial No.: 09/888,732

Confirmation No.: 2092

Filed: 25 June 2001

For: UNIDIRECTIONAL RESPIRATOR VALVE (As Amended)

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Remarks

The Office Action dated 28 August 2002 has been received and reviewed. Claims 2, 4, 5, and 12 have been cancelled. Claims 1, 3, 7, and 18 have been amended. New claims 22-42 are presented. The pending claims are claims 1, 3, 6-11, and 13-42. Reconsideration and withdrawal of the rejections are respectfully requested.

Claim Amendments

Claim 1 is amended to include the elements of original claim 2 and recite a decrease in valve flap thickness when moving between ends of the valve flap..

Claim 3 is amended to properly reflect its dependency from amended claim 1 in light of the cancellation of claim 2.

Claim 7 is amended to recite the language of amended claim 1.

Claim 18 is amended to recite a respirator including a valve flap in accordance with amended claim 1.

New claims 22 through 42 are presented to more provide comprehensive coverage of the invention.

No new matter is added.

Objection to the Title

The title of the present invention was objected to as not being descriptive. Applicants disagree with this objection.

However, to further move this application towards issuance, Applicants have amended the title such that it recites a "UNIDIRECTIONAL RESPIRATOR VALVE." Reconsideration and withdrawal of this objection are, therefore, respectfully requested.

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Original Claim 12

Claim 12 was indicated as allowable over the art, but rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants have canceled original claim 12 and presented new independent claim 22, incorporating the limitations of claim 12 and its base claim, i.e., original claim 1. The limitations recited in original claim 12 have been amended to address the Examiner's concerns under § 112. Support for claim 22 can be found in original claim 12, as well as in the Specification at, e.g., page 8, lines 13-28 and page 9, lines 27-30.

Applicants respectfully submit that new claim 22 is both allowable over the art and in compliance with the requirements of 35 U.S.C. § 112. Reconsideration and withdrawal of this rejection are, therefore, respectfully requested.

The 35 U.S.C. § 102(b) Rejections

Claims 1-2 and 4 were rejected under 35 U.S.C. § 102(b) as being anticipated by Young et al. (U.S. Patent No. 2,378,613). Applicants disagree with this rejection.

However, to further move this case towards issuance, Applicants have canceled claims 2 and 4 and amended claim 1 to recite the limitations of canceled claim 2 and, further, to recite that the thickness of the valve flap decreases when moving from the first end to the second end or from the second end to the first end of the valve flap. Support for the amendments can be found in original claim 2, and in the Specification at, e.g., page 6, lines 21-32. Amended claim 1 is not anticipated by Young et al. because the cited reference does not teach each and every element of claim 1. For a claim to be anticipated under 35 U.S.C. § 102(b), each and every element of the claim must be found in a single prior art reference. See M.P.E.P. § 2131.

For example, claim 1 recites that the valve flap is thicker at the first end than at the second end. In contrast, Young et al. discloses a fuel tank flapper valve 10 with a closure disc 11 (the alleged valve flap) that is thickened in the central region 15. See, Young et al., page 1, column 2, lines 16-18. As a result, the closure disc 11 of Young et al. increases and then

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decreases when moving from one end to the other. The closure disc 11 does not have a valve flap thickness that decreases when moving from the first end to the second end or from the second end to the first end of the valve flap as recited in claim 1. Because Young et al. does not teach each and every element of claim 1, it cannot anticipate claim 1.

For at least the above reasons, Applicants submit that claim 1 is not anticipated by Young et al. Reconsideration and withdrawal of this rejection are, therefore, respectfully requested.

Claims 1, 6-8, 13-16, and 18-21 were rejected under 35 U.S.C. § 102(b) as being anticipated by Braun (U.S. Patent No. 4,934,362). Applicants disagree with this rejection.

However, to further move this case towards issuance, Applicants have amended claims 1 and 18 as described above.

Applicants submit that claims 1, 6-8, 13-16, and 18-21 are not anticipated by Braun because each and every element of claims 1, 6-8, 13-16, and 18-21 is not disclosed by Braun. For example, amended independent claims 1 and 18 recite that the valve flap thickness varies between the first and second sides and that the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end of the valve flap.

In contrast, Braun teaches a fluid valve including a valve flap preferably having a uniform thickness. *See* Braun, column 6, lines 33-35. Although Braun allegedly teaches that the disclosed flap may be thinner towards its free ends, Braun does not teach that the flap's thickness varies from side to side and that the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end of the valve flap. Because Braun does not teach each and every element of independent claims 1 and 18, Braun cannot anticipate those claims.

Claims 6-8, 13-16, and 19-21, which depend from either claim 1 or claim 18, are not anticipated by Braun for the same reasons as presented above for claims 1 and 18. In addition, claims 6-8, 13-16, and 19-21 each recite additional elements that further support patentability when combined with either claim 1 or claim 18.

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For example, claim 6 recites that the valve flap includes at least one rib extending from a top surface of the valve flap. In contrast, Braun teaches a rectangular, flexible, elastomeric flap 24 that is cut from a flat sheet of pure gum rubber. Braun does not teach that the disclosed flap includes at least one rib extending from the top surface of the valve flap as recited in claim 6.

It is asserted in the Office Action that Braun discloses ribs on a valve flap. Applicants submit, however, that the structure of the alleged ribs is not clearly described by the text of Braun or in the figures. If this rejection is maintained, Applicants request further documentation to allow more complete consideration of the asserted structure. Further, Applicants note that the valve flaps are not disclosed as varying in thickness from side to side and having a thickness that decreases when moving from the first end to the second end or from the second end to the first end of the valve flap.

With respect to claim 9, Braun does not teach that the valve flap has a curvature that causes a bias of the valve flap toward the valve seat. Rather, as noted above, the valve flaps of Braun are cut from a flat sheet with no curvature.

For at least the above reasons, Applicants submit that claims 1, 6-8, 13-16, and 18-21 are not anticipated by Braun. Reconsideration and withdrawal of this rejection are, therefore, respectfully requested.

The 35 U.S.C. § 103(b) Rejections

Claims 1, 6-8, 13-16, and 18-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the claimed invention in Braun.

Applicants disagree with this rejection and submit that claims 1, 6-8, 13-16, and 18-21 are not *prima facie* obvious for at least the following reasons. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. See M.P.E.P. § 2143.

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Applicants submit that claims 1, 6-8, 13-16, and 18-21 are not *prima facie* obvious because there is no suggestion or motivation to modify Braun to produce the present invention. For example, the Office Action alleges that it would have been obvious to one of ordinary skill in the art to provide the device taught by Braun as modified by the specification (i.e., column 1, lines 30-39) to provide a functional valve with nonuniform thickness such that the flap may be lifted with less resistance and greater ease for the user. Applicants disagree with this assertion.

Applicants submit that the asserted motivation to combine the teachings of the Background of Braun with those of the invention taught by Braun is insufficient to meet the requirements of *prima facie* obviousness. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. Given that Braun was aware of the Siebe North Inc. respirator, it would have been well within the capability of Braun to describe the desirability of combining such respirator with the disclosed fluid valve. However, Braun did not do so. Braun's silence as to such a combination cannot substitute for the requisite motivation to modify Braun to produce the present invention. "Silence in a reference is hardly a proper substitute for an adequate disclosure of facts from which a conclusion of obviousness may justifiably follow." *In re Burt and Walter*, 148 U.S.P.Q. 548, 553 (C.C.P.A. 1966).

Further, the disclosed ribs of the Siebe North respirator are "diametrically aligned" and it is, at best, unclear how diametrically aligned ribs could be incorporated into a valve flap that is rectangular such as that disclosed by Braun.

Further claims 1, 6-8, 13-16, and 18-21 are not *prima facie* obvious because Braun does not teach every element of such claims. As stated above in regard to the 35 U.S.C. § 102(b) rejections of claim 1, 6-8, 13-16, and 18-21, Braun does not teach every element of such claims (e.g., a valve flap having a thickness that varies from the first side to the second side and a thickness that decreases when moving from the first end to the second end or from the second end to the first end of the valve flap).

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For at least the above reasons, Applicants submit that claims 1, 6-8, 13-16, and 18-21 are not *prima facie* obvious. Reconsideration and withdrawal of this rejection are, therefore, respectfully requested.

Claims 3 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Young et al. Claim 5 has been canceled, rendering its rejection moot.

Applicants disagree with the rejection as applied to claim 3. A case of *prima facie* obviousness has not been established because Young et al. does not teach every element of such claims. For example, claim 3 depends from independent claim 1. As stated above in regard to the 35 U.S.C. § 102(b) rejection of claim 1, Young et al. does not teach every element of claim 1. In addition, claim 3 recites additional elements that further support patentability when combined with independent claim 1.

For at least the above reasons, Applicants submit that claim 3 is not *prima facie* obvious in view of Young et al. Reconsideration and withdrawal of this rejection are, therefore, respectfully requested.

Claims 9-11 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Braun in view of Japuntich (U.S. Patent No. 5,325,892).

Applicants traverse this rejection and submit that claims 9-11 and 17 are not *prima facie* obvious because the combination of Braun and Japuntich does not teach all of the elements of such claims. For example, claim 9 recites that the valve flap has a curvature.

In contrast to claim 9, the combination of Braun and Japuntich does not teach all of the elements of claim 9. As admitted by the Office Action, Braun does not teach a valve flap that has a curvature. The addition of Japuntich et al. does nothing to cure this deficiency already present in Braun. For example, Japuntich et al. teaches a unidirectional fluid valve having a flap that is flat, i.e., a flap that is not contoured. "The flexible flap preferably assumes a flat configuration where no forces are applied" Japuntich et al., column 7, lines 41-42. Furthermore, "[t]he flexible flap is preferably cut from a flat sheet of material" *Id.* at

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column 7, lines 55-56. In other words, Japtunich et al. does not disclose a "curved valve flap" as asserted in the Office Action.

Neither does Japtunich et al. disclose a "planar valve seat" as asserted in the Office Action. Rather, the valve seat of the present invention (see, e.g., reference number 54 in FIG. 4 and Specification, page 6, lines 3-13) corresponds to the structure described in Japtunich et al. as the "seal ridge 30." See, e.g., Japtunich et al., column 5, lines 47-49 and FIGS. 3-4. As used in connection with the present invention, the valve seat is the structure against which the valve flap rests to create the desired seal. In Japtunich et al. that structure is referred to as the seal ridge. Furthermore, the seal ridges disclosed by Japtunich et al. are all non-planar – in direct contradiction with the assertion on which this rejection is based.

For at least the above reasons, Applicants submit that claims 9-11 and 17 are not *prima facie* obvious in view of the cited references. Reconsideration and withdrawal of this rejection are, therefore, respectfully requested.

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Summary

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for
MITTELSTADT et al.

By

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CERTIFICATE UNDER 37 C.F.R. § 1.8:

The undersigned hereby certifies that this paper is being transmitted by facsimile in accordance with 37 C.F.R. § 1.6(d) to the Patent and Trademark Office, addressed to Assistant Commissioner for Patents, Washington, D.C. 20231, on this 28th day of January, 2003, at 2:06 p.m. (Central Time).

By: 

Name: Rachel England-Gibson

APPENDIX A - CLAIM AMENDMENTS
INCLUDING NOTATIONS TO INDICATE CHANGES MADE

Serial No.: 09/888,732

Docket No.: 56733US002

(formerly 56733USASA.002)

Amendments to the title and existing claims are indicated by underlining what has been added and bracketing what has been deleted.

In the Title

The title has been amended as follows:

UNIDIRECTIONAL RESPIRATOR VALVE

In the Claims

For convenience, all pending claims are shown below.

1. (Once Amended) A unidirectional valve comprising:
a valve body including a frame, a valve opening through the frame, and a valve seat extending from the frame and at least partially surrounding the valve opening; and
a valve flap having a first portion attached to the frame and an adjacent second portion free to move from a first position where the second portion is in contact with at least a part of the valve seat to a second position where at least part of the second portion is spaced from the valve seat, wherein the [valve flap has a nonuniform thickness] second portion of the valve flap comprises a first side spaced from a second side and a first end proximate the first portion and a second end spaced from the first end, wherein the valve flap thickness varies between the first and second sides, and further wherein the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end.

3. (Once Amended) The unidirectional valve of claim [2], wherein the valve flap has a minimum thickness and a maximum thickness between the first and second sides, and wherein the maximum thickness is at least about 10% greater than the minimum thickness.

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6. The unidirectional valve of claim 1, wherein the valve flap further comprises a top surface, a bottom surface, and at least one rib extending from the top surface of the valve flap.
7. (Once Amended) The unidirectional valve of claim 6, wherein the at least one rib provides [the nonuniform thickness of] the valve flap thickness variations between the first and second sides.
8. The unidirectional valve of claim 7, further comprising a plurality of ribs, wherein each of the plurality of ribs is spaced from each adjacent rib.
9. The unidirectional valve of claim 1, wherein the valve seat is generally planar and the valve flap has a curvature that causes a bias of the valve flap toward the valve seat to provide a seal between the valve flap and the valve seat.
10. The unidirectional valve of claim 9, wherein at least a portion of the curvature of the valve flap is at least partially flattened when the valve flap contacts the valve seat.
11. The unidirectional valve of claim 9, wherein the bias of the valve flap toward the valve seat is sufficient to provide a seal between the valve flap and the valve seat in any orientation of the unidirectional valve.
13. The unidirectional valve of claim 1, wherein the valve flap has a bottom surface that is generally planar and wherein the valve seat is generally nonplanar.
14. The unidirectional valve of claim 1, wherein the frame of the valve body includes an angled portion adjacent the valve seat.

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15. The unidirectional valve of claim 1, wherein the valve is an exhalation valve.
16. The unidirectional valve of claim 1, wherein the valve is an inhalation valve.
17. The unidirectional valve of claim 1, wherein the valve flap is removably attached to the valve body.
18. **(Once Amended)** A respirator having a unidirectional valve, comprising;
a face mask having at least one opening for receiving a unidirectional valve; and
a unidirectional valve comprising:
 - a valve body including a frame, a valve opening through the frame, and a valve seat extending from the frame and at least partially surrounding the valve opening; and
 - a valve flap having a first portion attached to the frame and an adjacent second portion free to move from a first position where the second portion is in contact with at least a part of the valve seat to a second position where at least part of the second portion is spaced from the valve seat, wherein the [valve flap has a nonuniform thickness] second portion of the valve flap comprises a first side spaced from a second side and a first end proximate the first portion and a second end spaced from the first end, wherein the valve thickness varies between the first and second sides, and further wherein the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end.
19. The respirator of claim 18, wherein the face mask is formed of a filtering material.
20. The respirator of claim 18, wherein the unidirectional valve is an exhalation valve.

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21. The respirator of claim 18, wherein the unidirectional valve is an inhalation valve.
22. (New) A unidirectional valve comprising:
a valve body including a frame, a valve opening through the frame, and a valve seat
extending from the frame and at least partially surrounding the valve opening; and
a valve flap having a first portion attached to the frame and an adjacent second portion
free to move from a first position where the second portion is in contact with at least a part of the
valve seat to a second position where at least part of the second portion is spaced from the valve
seat, wherein the valve flap has a nonuniform thickness and a stiffness to mass ratio;
wherein the valve flap has the same perimeter, shape, and attachment means as a second
valve flap having a uniform thickness, wherein the stiffness to mass ratio of the valve flap is
higher than the stiffness to mass ratio of the second valve flap.
23. (New) The unidirectional valve of claim 22, wherein the valve flap comprises a first side spaced from a second side, and further wherein the valve flap thickness varies between the first side and the second side.
24. (New) The unidirectional valve of claim 23, wherein the valve flap has a minimum thickness and a maximum thickness between the first and second sides, and wherein the maximum thickness is at least about 10% greater than the minimum thickness.
25. (New) The unidirectional valve of claim 22, wherein the second portion of the valve flap comprises a first end proximate the first portion and a second end spaced from the first end, and further wherein the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end.

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26. (New) The unidirectional valve of claim 22, wherein the valve seat is generally planar and the valve flap has curvature that causes a bias of the valve flap toward the valve seat to provide a seal between the valve flap and the valve seat.
27. (New) The unidirectional valve of claim 26, wherein at least a portion of the curvature of the valve flap is at least partially flattened when the valve flap contacts the valve seat.
28. (New) The unidirectional valve of claim 26, wherein the bias of the valve flap toward the valve seat is sufficient to provide a seal between the valve flap and the valve seat in any orientation of the unidirectional valve.
29. (New) The unidirectional valve of claim 22, wherein the valve flap has a bottom surface that is generally planar and wherein the valve seat is generally nonplanar.
30. (New) The unidirectional valve of claim 22, wherein the frame of the valve body comprises an angled portion adjacent the valve seat.
31. (New) The unidirectional valve of claim 22, wherein the valve is an exhalation valve.
32. (New) The unidirectional valve of claim 22, wherein the valve is an inhalation valve.
33. (New) The unidirectional valve of claim 22, wherein the valve flap is removably attached to the valve body.
34. (New) A unidirectional valve comprising:
a valve body including a frame, a valve opening through the frame, and a valve seat extending from the frame and at least partially surrounding the valve opening; and

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a valve flap having a first portion attached to the frame and an adjacent second portion free to move from a first position where the second portion is in contact with at least a part of the valve seat to a second position where at least part of the second portion is spaced from the valve seat, wherein the second portion of the valve flap comprises a first end proximate the first portion, a second end spaced from the first end, a top surface, a bottom surface, and at least one rib extending from the top surface of the valve flap for at least a part of the distance from the first end to the second end.

35. (New) The unidirectional valve of claim 34, wherein the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end.

36. (New) The unidirectional valve of claim 34, wherein the at least one rib comprises a plurality of ribs, wherein each of the plurality of ribs is spaced from each adjacent rib.

37. (New) The unidirectional valve of claim 34, wherein the at least one rib extends from the first end to the second end.

38. (New) A respirator having a unidirectional valve, comprising;
a face mask having at least one opening for receiving a unidirectional valve; and
a unidirectional valve comprising:

a valve body including a frame, a valve opening through the frame, and a valve seat extending from the frame and at least partially surrounding the valve opening; and

a valve flap having a first portion attached to the frame and an adjacent second portion free to move from a first position where the second portion is in contact with at least a part of the valve seat to a second position where at least part of the second portion is spaced from the valve seat, wherein the second portion of the valve flap

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comprises a first end proximate the first portion, a second end spaced from the first end, a top surface, a bottom surface, and at least one rib extending from the top surface for at least a part of the distance from the first end to the second end.

39. (New) The respirator of claim 38, wherein the valve flap thickness decreases when moving from the first end to the second end or from the second end to the first end.
40. (New) The respirator of claim 38, wherein the face mask is formed of a filtering material.
41. (New) The respirator of claim 38, wherein the unidirectional valve is an exhalation valve.
42. (New) The respirator of claim 38, wherein the unidirectional valve is an inhalation valve.